UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte Brian John Cragun, Todd Mark Kelsey, Stephen Hollis Lund

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Appeal No. _____
Application No. 09/004,034

APPEAL BRIEF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Brian John Cragun et al.	Art Unit:	2764
Serial No.:	09/004,034	Examiner:	Robert A. Weinhardt
Filed:	January 7, 1998	Atty. Docket No.:	IBM/33B
For:	AUTOMATIC SALES PROMOTION SELECTION SYSTEM AND METHOD		

APPEAL BRIEF

Assistant Commissioner for Patents
ATTENTION: Board of Patent Appeals and Interferences
Washington, D.C. 20231

I. REAL PARTY IN INTEREST

This application is assigned to International Business Machines Corporation, of Armonk, New York.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-26 and 39 are pending in the Application, with claims 1, 9, 17 and 23 being once amended, and claims 27-38 being canceled. Claims 5-6, 13-14, 19, 21 and 26 were objected to and found to be directed to allowable subject matter, and as such, claims 1-4, 7-12, 15-18, 20 and 22-25 currently stand rejected, and are now on appeal.

IV. STATUS OF AMENDMENTS

An Amendment After Final was filed on June 28, 2000 subsequent to final rejection, in which claims 27-38 were canceled without prejudice. These amendments were entered by the Examiner in the Advisory Action dated July 13, 2000.

V. SUMMARY OF INVENTION

The claims at issue are directed to automated sales promotion selection systems and methods that identify sales promotions for a current customer using a selectively adaptable purchase advisor neural network. The purpose of such systems and methods is to generally increase sales opportunities by attempting to generate targeted sales promotions to a customer based upon that customer's purchases.

A neural network is a well-known type of logic system in which logic functions are represented by collections of nodes, or neurons, interconnected with one another via weighted connections. Neural networks often find use in situations where specific logic rules may not be readily discernable based upon complex and uncertain relationships between multiple factors.

A neural network is typically initialized by a "training" process, whereby input data sets are processed through the network, with the output compared to known or desirable outputs. Various algorithms are then used to progressively adjust the weighting functions for the weighted connections between nodes to minimize errors in the network output, until an acceptable level of error is obtained across the range of permissible input data. Weighting functions are not fixed during training, thereby permitting a network to learn and evolve based upon the input provided to the network.

In the context of the invention, the use of a purchase advisor neural network permits custom tailored sales promotions to be selected based upon customer data such as the specific items purchased by a customer, and without requiring a developer to explicitly program or even comprehend the complex logical rules that associate desirable promotions with particular combinations of items being purchased by a customer. Rather, by training the neural network with the desired results of past transactions (e.g., "significant" purchases), the logic necessary to select desirable sales promotions may be implemented with significantly less expense and complexity, and often with greater accuracy and performance than with standard procedural or boolean logic.

In one specific embodiment of the invention, an automated sales promotion selection system uses customer data such as purchase transaction information to segment items being purchased by a customer into one or more purchase classes (see Specification, page 9, lines 8-26, as well as blocks 54, 56 of Fig. 2). The purchase classes may be based on a variety of factors

(e.g., as discussed at page 10, lines 3-13), although in general the members or items in a purchase class are typically of the type that are commonly purchased together.

A neural network is then typically used to predict missing items that are ordinarily purchased in a transaction at the same time as the items being purchased (see Specification, page 10, lines 14-25, as well as block 58 of Fig. 2). Based upon the output of any missing items by the neural network, sales promotions suitable for those missing items are suggested (see Specification, page 10, lines 25-30, as well as block 60 of Fig. 2).

Another important aspect of the invention is the selectively adaptable nature of the automated sales promotion selection system based upon past customer data. In particular, the response of a neural network implemented in such a system may be selectively adapted based on past customer data to optimize the performance of the system for future customers.

For example, as described in greater detail in the Specification in connection with Figs. 14-17 (e.g., at page 22, line 4 to page 27, line 5), the aforementioned automated sales promotion selection system embodiment may be used to selectively update purchase class memberships responsive to past customer data. By doing so, therefore, future customer purchases may be found to invoke different purchase classes, and as a result, different missing items may be suggested by the neural network. As a result, the response of the system may be varied so that, even in response to the same customer data input, different promotions might be suggested before and after adaptation of a neural network.

VI. ISSUE

Whether claims 1-4, 7-12, 15-18, 20, 22-25 and 39 were improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,649,114 to Deaton et al.

VII. GROUPING OF CLAIMS

For the purposes of appeal, the following groupings of claims are considered to be separately patentable, with the claims within each claim grouping standing or falling together:

Group I: claims 1-3, 7-11, 15-18, 20 and 22-25

Group II: claims 4, 12 and 39

VIII. ARGUMENT

Applicants respectfully submit that the Examiner's obviousness rejections of claims 1-4, 7-12, 15-18, 20, 22-25 and 39 based upon U.S. Patent No. 5,649,114 to Deaton et al. are not supported on the record, and that the rejections should be reversed.

A *prima facie* showing of obviousness requires that the Examiner establish that the differences between a claimed invention and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. §103(a). Such a showing requires that all claimed features be disclosed or suggested by the prior art. Such a showing also requires objective evidence of the suggestion, teaching or motivation to combine or modify prior art references, as "[c]ombining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight." In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)."

Applicants respectfully submit that, in the instant case, the Examiner has failed to establish a *prima facie* case of obviousness as to any of the pending claims, and as such, the rejections should be reversed. Specific discussions of the non-obviousness of each of the aforementioned groups of claims are presented hereinafter.

A. The Group I Claims (Claims 1-3, 7-11, 15-18, 20 and 22-25) were improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over Deaton et al.

Claim 9, which is indicative of the Group I claims, recites an apparatus including a storage unit, a central processing unit, and a purchase advisor neural network stored in the storage unit. The central processing unit is configured to receive customer data relating to a current customer, while the purchase advisor neural network is configured to respond to the customer data received by the central processing unit and identify a sales promotion for the current customer. Furthermore, claim 9 recites that "the response of the purchase advisor neural network for future customers is selectively adaptable by the central processing unit in response to customer data." (*emphasis added*).

The response of any computer logic, including a neural network, generally refers to the rules embodied in the logic that determine what output is generated in response to specific input.

As such, by selectively adapting the response of a neural network, as in claim 9, the underlying rules embodied by the neural network are, in effect, adapted to essentially optimize performance of the neural network and the overall sales promotion selection system over time, such that future sales promotion selection operations are more effective. Put another way, given a particular set of input data, varying the response of a neural network results in the possibility of different output data being generated by the neural network than would have otherwise been generated by the neural network prior to modifying the response.

The Examiner relies on Deaton et al. for teaching a system that identifies a sales promotion for an item likely to be purchased by a customer. The Examiner also asserts that Deaton et al. discloses a selectively adaptable system. However, the Examiner admits that there is no teaching in Deaton et al. for the use of a neural network in a sales promotion selection system. Instead, the Examiner relies on Official Notice to establish that neural networks are well known in the art and are known to be useful in the analysis and determination of relationships and patterns.[1]

Contrary to the Examiner's assertions, however, Applicants respectfully submit that the Examiner has failed to support a *prima facie* case of obviousness as to the Group I claims. In particular, Applicants respectfully submit that, contrary to the Examiner's assertions, Deaton et al. does not teach or suggest the selective adaptation of the response of a sales promotion selection system in response to customer data.

Claim 9 specifically recites selectively adapting the response of a purchase advisor neural network for future customers in response to customer data. As discussed above, varying the response of a logic system such as a neural network incorporates varying the data that is output

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[1] In response to Applicants request for support for the Official Notice, the Examiner mentions three new references: U.S. Patent No. 5,521,813 to Fox et al. (hereinafter "Fox et al."); "Japan Knowledge Industry Develops Sales Planning SW", Comline News Service (hereinafter "Comline"); and Klimasauskas, C., "Brainy New Player: Neural Nets in Industrial Automation", Electronic Engineering Times (hereinafter "EE Times"). However, given the manner that the Examiner relies on these secondary references in making the obviousness rejections, it appears that the Examiner is in fact rejecting the claims on the combination of Deaton et al. with these additional references. If this is in fact the case, Applicants respectfully request that the Examiner or the Board (if appropriate) clarify the proper grounds for rejection of the claims at issue.

by the system in response to specific input, so that the output of a system presented with a given set of input before an alteration to the system's response is different than the output of the system presented with the same input after the alteration.

In contrast, Deaton et al. appears to disclose nothing more than outputting different data (i.e., a different suggested promotion) in response to different input data, e.g., based upon different customer history data compiled over time. The only disclosure in Deaton et al. relied upon by the Examiner with respect to the concept of adapting the response of the Deaton et al. system is found at col. 71, lines 13-17 (First Office Action, paragraph 7), which discusses changing a marketing program for a customer based upon that customer's subsequent performance. While the marketing program for a particular customer may be changed in response to customer purchases, however, the underlying response, or rules, implemented by the Deaton et al. system are not modified.

The Board's attention is directed specifically to columns 118-125, and the accompanying Figures 46A-B and 47 in Deaton et al., for a discussion of "echo" coupons that are issued by the Deaton et al. system responsive to items previously purchased by a customer. From the cited columns in Deaton et al., it is evident that the underlying rules relied upon by the Deaton et al. system do not change -- any feedback such as past purchases or redemptions of incentives are treated as inputs so that the application of the same rules to the different inputs results in different outputs.

As specifically discussed starting at column 121, line 54 of Deaton et al., a set of exemplary rules are presented to determine how an "echo" coupon is generated for a particular customer transaction. It should be noted that different customers will be handled in different manners based upon the data associated with each of the customers. Moreover, as a customer's purchase history and redemption of previous incentives develops over time, the application of the rules to a particular customer transaction will change the incentive selected for that customer. At no time, however, are the rules themselves adapted in response to customer data.

To further illustrate the distinction between a selective adaptable system (e.g., as recited in claim 9) and a non-adaptable system that simply adjusts its output responsive to past activities by a customer (e.g., as disclosed in Deaton et al.), consider a marketing system that employs a rule that states that a particular type of customer should receive coupon A if that customer

purchased a particular product within the last *X* days, otherwise the customer should receive coupon B. In both an adaptable system and a non-adaptable system, the output of each system will vary between first and second selection operations for a particular customer if, for example, as of the first selection operation, the customer has bought the product in the last *X* days, but at the time of the second selection operation, the customer has not. In an adaptable system, however, a further functionality may be supported whereby the value of *X* could be modified between the first and second selection operations so that the rule applied during the second selection operation is effectively different than that applied in the first operation. A non-adaptable system such as Deaton et al., however, is not capable of supporting such functionality.

Even if the Examiner is able to maintain a position that neural networks are known, and that neural networks have been used in marketing and sales systems, the Examiner still can point to no suggestion or motivation in the art to modify the Deaton et al. system to provide a selectively adaptable response for future customers based on customer data. Absent establishing such motivation, the rejections cannot be maintained.

As discussed above, Deaton et al. does not disclose or suggest adapting the response of a sales promotion selection system -- the basic rules defined in the Deaton et al. system are static and do not adapt over time. The Examiner's assertion of Official Notice likewise does not address this issue, and as the secondary references mentioned by the Examiner (namely Fox et al., Comline and EE Times) are neither explicitly utilized in any obviousness rejection, nor proffered for supporting any allegation as to the desirability of adapting the response of a sales promotion selection system, the Examiner has failed to present any objective evidence of motivation as would be required to maintain a *prima facie* case of obviousness.

Even were the secondary references explicitly utilized in making a rejection or as providing evidence of motivation, the references would still fail to suggest adapting the response of a sales promotion selection system for future customers based on customer data. These secondary references establish nothing more than a general appreciation that neural networks can be used in marketing/sales applications, and are devoid of any specifics or suggestion as to the feasibility or desirability of adapting the response of an automated system in selecting sales promotions for future customers based on customer data.

As such, Applicants respectfully submit that none of the art of record discloses or suggests each and every feature of claim 9 or any other Group I claim. As a result, a *prima facie* case of obviousness cannot be maintained as to the Group I claims.

Applicants therefore respectfully submit that the rejected Group I claims (independent claims 1, 9, 17 and 23 and claims 2-3, 7-8, 10-11, 15-16, 18, 20 and 22-25 which depend therefrom) are non-obvious over the references cited by the Examiner. Reversal of the Examiner's rejections of the Group I claims is therefore respectfully requested.

B. The Group II Claims (Claims 4, 12 and 39) were improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over Deaton et al.

The Group II claims additionally recite the concept that the response of the purchase advisor neural network is selectively adapted by updating at least one of a plurality of purchase classes based upon purchase data from previous customer transactions. The purchase classes comprise items frequently purchased together, such that an item likely to be purchased can be determined by locating items in selected classes that are missing from a set of items purchased by a customer. The selective adaptation of the purchase classes results in the members of one or more classes being modified responsive to previous customer transactions.

The only disclosure in Deaton et al. relied upon by the Examiner with respect to the concept of purchase classes is found at col. 71, lines 57-67 and col. 101, line 48 to col. 102, line 15 (First Office Action, paragraph 7). The passage at col. 71 relates to grouping together related items such as diapers and detergent, so that a coupon might be generated for a complementary item when the other item is being purchased. The passage at cols. 101-102 relates to manipulating product groups based on variables such as seasonality, e.g., so that products may be included or excluded from groups on certain holidays or other times of the year (e.g., hot cereal only during the winter).

There is no specific disclosure or suggestion in Deaton et al., however, as to the concept of selectively adapting membership of an item in a group responsive to customer data. The only suggestion in Deaton et al. is that of manually manipulating a group, e.g., in response to a manufacturer's or retailer's decision. However, such functionality is not suggested to be automated in any fashion, nor in response to any particular gathered data.

Furthermore, with respect to the secondary references relied upon to support Official Notice, these references suggest at most the basic process of training a neural network, and not any specifics as to managing the membership of items in a purchase class or group. Reading such references so broadly as to suggest these specifics goes well beyond any permissible inferences under the law, as there must be some evidence of a recognized motivation in the art to implement the membership management functionality that is the subject of the Group II claims. In this case, the Examiner appears to be looking solely at the "gist" of the invention, and not to the specific claim language in the Group II claims or the specific evidence of motivation that must be asserted to maintain a *prima facie* case of obviousness as to any of these claims.

Particularly in view of the fact that Applicants' claimed configuration permits optimization of the grouping of items in purchase classes, and consequently, optimization of future sales promotion selections, Applicants respectfully submit that the invention defined by the Group II claims provides a unique and unexpected advantage over the prior art of record. The rejections of the Group II claims therefore cannot be maintained, and reversal of the Examiner's rejections with regard to claims 4, 12 and 39 is therefore respectfully requested.

IX. CONCLUSION

In conclusion, Applicants respectfully request that the Board reverse the Examiner's rejections of claims 1-4, 7-12, 15-18, 20, 22-25 and 39, and that the Application be passed to issue. If there are any questions regarding the foregoing, please contact the undersigned at 513/241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

WOOD, HERRON & EVANS, L.L.P.

Date: 28 SEP 2000

By: _____

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APPENDIX A: CLAIMS ON APPEAL (S/N 09/004,034)

1. (Amended) An automated sales promotion selection system comprising:

an input device that receives customer data relating to purchases of items by customers;

a computer system including a central processing unit and a storage unit including a purchase advisor neural network and a plurality of item identifiers that identify items available for purchase, wherein the purchase advisor neural network responds to customer data received from the input device by determining if one or more of the item identifiers stored in the storage unit corresponds to an item likely to be purchased by one of the customers and identifies a sales promotion relating to the item, and wherein the central processing unit selectively adapts the response of the purchase advisor neural network for future customers in response to customer data; and

an output device that receives the item identifiers of the likely purchases determined by the purchase advisor neural network.

2. (Unchanged) The automated sales promotion selection system of claim 1, wherein the customer data received by the customer information device includes data relating to a purchase of one or more items that occurred during a current customer visit to a purchase location, and wherein the identified sales promotion comprises a list of items to be suggested for purchase during the current customer visit.

3. (Unchanged) The automated sales promotion selection system of claim 1, wherein the central processing unit assigns the items purchased by the customer during the present customer visit into predetermined purchase classes comprising items frequently purchased together, wherein the purchase advisor neural network determines an item likely to be purchased by receiving the purchase class assignments from the central processing unit and identifying as likely to be purchased those items that are members of a purchase class observed to be in a purchase by the customer but are missing from the items purchased, and wherein the identified sales promotion comprises a listing of at least one of the items determined to be missing from one of the purchase classes to be suggested to the customer for purchase during the current customer visit.

4. (Unchanged) The automated sales promotion selection system of claim 3, wherein the central processing unit selectively adapts the response of the purchase advisor neural network by updating at least one predetermined purchase class based upon purchase data from previous customer transactions.

5. (Unchanged) The automated sales promotion selection system of claim 1, wherein the storage unit further includes a customer demographics neural network that estimates buying characteristics of one or more customers most likely to be at a purchase location, and also produces item identifiers comprising the estimated item purchases of the estimated customers.

6. (Unchanged) The automated sales promotion selection system of claim 5, wherein the central processing unit receives the item identifiers of the estimated purchases from the customer demographics neural network, segments the item identifiers into purchase classes, and provides the purchase advisor neural network with the segmented item identifiers as input; and wherein the purchase advisor neural network responds to the input by determining if one or more of the item identifiers corresponds to an item likely to be purchased by one of the estimated customers.

7. (Unchanged) The automated sales promotion selection system of claim 1, wherein the storage unit further includes a neural network training subsystem that collects a set of sales purchase data generated by customer purchases, selects a training epoch subset of the collected sales purchase data, and performs a neural network training process with the selected data, and wherein the neural network training subsystem further repeatedly collects data, selects a training subset, and performs the training process until all neural network training epoch data subsets in the collected sales purchase data have been processed.

8. (Unchanged) The automated sales promotion selection system of claim 1, wherein the central processing unit selectively adapts the response of the purchase advisor neural network by retraining the purchase advisor neural network with purchase data from previous customer transactions.

9. (Once Amended) An apparatus comprising:

a storage unit;

a central processing unit configured to receive customer data relating to a current customer; and

a purchase advisor neural network stored in the storage unit and configured to respond to the customer data received by the central processing unit and identify a sales promotion for the current customer, wherein the response of the purchase advisor neural network for future customers is selectively adaptable by the central processing unit in response to customer data.

10. (Unchanged) The apparatus of claim 9, further comprising a plurality of item identifiers stored in the storage unit, the item identifiers identifying items available for purchase, wherein the customer data includes data relating to purchases of items by the customer, and wherein the purchase advisor neural network is configured identify the sales promotion by determining if one or more of the item identifiers stored in the storage unit corresponds to an item likely to be purchased by the customer.

11. (Unchanged) The apparatus of claim 10, wherein the customer data includes data relating to a purchase of one or more items that occurred during a current customer visit to a purchase location, wherein the identified sales promotion comprises a list of items to be suggested for purchase during the current customer visit, wherein the central processing unit assigns the items purchased by the customer during the present customer visit into predetermined purchase classes comprising items frequently purchased together, wherein the purchase advisor neural network determines an item likely to be purchased by receiving the purchase class assignments from the central processing unit and identifying as likely to be purchased those items that are members of a purchase class observed to be in a purchase by the customer but are missing from the items purchased, and wherein the identified sales promotion comprises a listing of at least one of the items determined to be missing from one of the purchase classes to be suggested to the customer for purchase during the current customer visit.

12. (Unchanged) The apparatus of claim 11, wherein the central processing unit selectively adapts the response of the purchase advisor neural network by updating at least one predetermined purchase class based upon purchase data from previous customer transactions.

13. (Unchanged) The apparatus of claim 10, wherein the storage unit further includes a customer demographics neural network that estimates buying characteristics of one or more customers most likely to be at a purchase location, and also produces item identifiers comprising the estimated item purchases of the estimated customers.

14. (Unchanged) The apparatus of claim 13, wherein the central processing unit receives the item identifiers of the estimated purchases from the customer demographics neural network, segments the item identifiers into purchase classes, and provides the purchase advisor neural network with the segmented item identifiers as input; and wherein the purchase advisor neural network responds to the input by determining if one or more of the item identifiers corresponds to an item likely to be purchased by one of the estimated customers.

15. (Unchanged) The apparatus of claim 10, wherein the storage unit further includes a neural network training subsystem that collects a set of sales purchase data generated by customer purchases, selects a training epoch subset of the collected sales purchase data, and performs a neural network training process with the selected data, and wherein the neural network training subsystem further repeatedly collects data, selects a training subset, and performs the training process until all neural network training epoch data subsets in the collected sales purchase data have been processed.

16. (Unchanged) The apparatus of claim 9, wherein the central processing unit selectively adapts the response of the purchase advisor neural network by retraining the purchase advisor neural network with purchase data from previous customer transactions.

17. (Once Amended) A method of dynamically identifying sales opportunities for purchases of items by customers from an inventory of items, the method comprising:

training a purchase advisor neural network that generates an output set of item identifiers comprising sales opportunities for purchases of the items;

providing the trained purchase advisor neural network with customer data;

generating a sales opportunity output for a current customer with the trained purchase advisor neural network in response to the customer data, the output including one or more item identifiers that identify items in the inventory;

selecting a set of item identifiers from among the sales opportunity output generated by the purchase advisor neural network as potential purchases from the inventory of items; and

selectively adapting the response of the purchase advisor neural network for future customers in response to customer data.

18. (Unchanged) The method of claim 17, wherein providing customer data comprises providing the purchase advisor neural network with data that relates to a purchase of one or more items by a customer that occurred during a present visit by the customer to a purchase location.

19. (Unchanged) The method of claim 17, wherein selecting item identifiers of potential purchases for the customer comprises:

estimating buying characteristics of one or more customers most likely to be at a purchase location; and

estimating item identifiers of items most likely to be purchased by the estimated customers.

20. (Unchanged) The method of claim 17, wherein training the purchase advisor neural network comprises:

collecting a set of sales purchase data for a plurality of customers;

selecting a training epoch subset of the collected sales purchase data;

performing a neural network training process with the selected data in which network coefficients are modified; and

repeating the selection of training epoch subsets and the performance of the neural network training process until all neural network training epoch data subsets in the collected sales purchase data have been processed.

21. (Unchanged) The method of claim 17, wherein providing customer data comprises:

training a demographics neural network that generates an output set of data defining predicted purchases of customers during a purchasing transaction;

providing the trained demographics neural network with prediction data comprising the current date, current time of day, and environmental information; and

generating with the demographics neural network predicted customer purchases.

22. (Unchanged) The method of claim 17, wherein selectively adapting the response of the purchase advisor neural network includes retraining the purchase advisor neural network with purchase data from previous customer transactions.

23. (Once Amended) A method of dynamically identifying a sales opportunity for a customer, the method comprising:

receiving customer data relating to a current customer;

generating with a purchase advisor neural network a sales opportunity output for the current customer in response to the customer data; and

selectively adapting the response of the purchase advisor neural network for future customers in response to customer data from previous customer transactions.

24. (Unchanged) The method of claim 23, wherein the customer data includes data relating to a selection of one or more items by a customer that occurred during a present visit by the customer to a purchase location, and wherein the sales opportunity output includes one or more item identifiers that identify additional items in the inventory.

25. (Unchanged) The method of claim 23, wherein selectively adapting the response of the purchase advisor neural network includes retraining the purchase advisor neural network with purchase data from previous customer transactions.

26. (Unchanged) The method of claim 23, further comprising:

providing a demographics neural network with prediction data comprising the current date, current time of day, and environmental information; and

generating with the demographics neural network an output set of data defining predicted purchases of customers during a purchasing transaction based upon the prediction data.

27-38. Canceled.

39. (Unchanged) An automated sales promotion selection system comprising:

an input device that receives customer data relating to purchases of items by customers;

a computer system including a central processing unit and a storage unit including a purchase advisor neural network and a plurality of item identifiers that identify items available for purchase, wherein the purchase advisor neural network responds to customer data received from the input device by analyzing a plurality of purchase classes comprising items frequently purchased together to determine if one or more of the item identifiers stored in the storage unit corresponds to an item likely to be purchased by one of the customers and identifies a sales promotion relating to the item, and wherein the central processing unit selectively adapts the response of the purchase advisor neural network by updating at least one of the plurality of purchase classes in response to customer data; and

an output device that receives the item identifiers of the likely purchases determined by the purchase advisor neural network.